Biodegradation of 2-methylisoborneol by Bacillus idriensis isolated from biological activated carbon

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ABSTRACT

2-Methylisoborneol (2-MIB) is one of typical odorants in potable water sources, which is hardly removed by conventional water treatment process. In this study, three bacterial strains capable of removing 2-MIB singly from drinking water were isolated from activated carbon of sand filter. They were identified to be Shinellazoogloeoides, Bacillus idriensis and Chitinophagaceae bacterium, respectively, based on 16S rRNA gene sequence analysis. In mineral salts medium containing 2-MIB as the sole carbon source, removal efficiencies of 20 μg/L 2-MIB in three days were 23.3%, 32.9% and 17.0% for Shinellazoogloeoides, Bacillus idriensis and Chitinophagaceae bacterium, respectively. Interestingly, the Bacillus idriensis isolate was not sensitive to the growth temperature, pH and initial concentration of 2-MIB, and could tolerate a rather high concentration of 2-MIB. Moreover, we found that the biodegradation of 2-MIB was significantly improved with the presence of cometabolism carbon source such as glycerol and glucose. After 20 d incubation, the concentration of 2-MIB was reduced from 2 mg/L to 368.2 μg/L and 315.4 μg/L by Bacillus idriensis in the absence or presence of glycerol, respectively.

Keywords: 2-MIB; Biodegradation; Shinellazoogloeoides; Bacillus idriensis; Chitinophagaceae bacterium; Cometabolism

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